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AUTOBIOGRAPHICAL NOTES

By HENRY WETHERBEE HENSHAW

(Concluded from page 60)

VISIT THE HAWAIIAN ISLANDS

IN DECEMBER, 1894, still in search of the priceless boon of health, I sailed for the Hawaiian Islands on the iron barkentine, "Annie Johnson", and after a delightful voyage of 18 days landed at Hilo, Island of Hawaii, which was to be my abiding place for several years. I thus was present during the exciting days of the insurrection which occurred in January, 1895. This was quickly suppressed, being practically confined to Honolulu.

After a residence of several years in the Islands, it occurred to me that, as I enjoyed the protection of the island laws and was accorded all the privileges of a citizen, I ought to assume the duties that pertain to citizenship. Accordingly I took the necessary steps to become a citizen of the island Republic, and assumed the not too arduous duties of paying taxes, serving on juries, and the like. The Republic, however, proved short-lived, for the islands were formally annexed to the United States as a territory July 7, 1898, when automatically I again became a citizen of the United States.

TAKE UP PHOTOGRAPHY

My strength returning slowly, I devoted much time during the first part of my stay in Hawaii to photography, which was a pursuit entirely new to me, as I had taken it up only a few months before, chiefly for the purpose of securing good photographs of the California Indians. The palms and strange forms of vegetation, the waterfalls, the picturesque coast, and the fleecy clouds of these sub-tropical islands all conspire to arouse the photographer's enthusiasm. Just before leaving California I had learned to use platinotype paper, which is unexcelled for permanency and for artistic effects, and I was the first, I believe, to introduce the use of the paper into the islands.

Continuing my photographic work, one day I awoke to find myself famous as a photographer, and was induced by my friends to place the results of my handiwork of the camera on sale both in Honolulu and Hilo, the result being the sale of some thousands of prints, which are now scattered all over the world. I look upon my adventure in photography with great pleasure, and regard the results as a partial but grateful return for the delightful years spent in this island garden spot, of the many friends it was my privilege to make, and their innumerable acts of kindness and hospitality. Here, where no man is treated as a stranger, but always as a welcome guest, is found the kindest climate in the world, beautiful scenery on all sides, and a contentment with life unknown in less favored regions.

I may add that while these lines are being written my Hawaiian negatives to the number of over 300 have been purchased by George Shiras 3rd, and by him donated to the National Geographic Society, by which they will be utilized, as I hope, for many years to come, for illustrative purposes.

BECOME ACQUAINTED WITH BROTHER M. NEWELL

Soon after reaching Hilo I made the acquaintance of Brother Matthias (M. Newell), who was a member of the Catholic Brotherhood and had long lived

in the Islands. Although he had made no very extensive collection of Hawaiian birds he was much interested in the subject, and was always ready to impart any information he had in respect to their haunts and habits. He presented me with the first and only specimen I ever saw of the shearwater (*Puffinus newelli*), which he had obtained on the island of Maui, and which I described as new. He still lives in Hilo, where he is Inspector for the Division of Plant Inspection of the Territory, and still maintains his interest in birds.

HAWAIIAN BIRDS AND THEIR FOREST HOME

As soon as strength permitted I abandoned the camera largely and began to find my way into the dense tropical forests, much of which is impassable except by cutting one's way through the tangled jungle of ferns, creeping vines, and shrubbery, or by the infrequent trails made by the coffee planters. Hawaiian birds had been studied and collected by several before my time, notably by the English collectors, R. C. L. Perkins, Scott B. Wilson, and Henry Palmer, the latter of whom, with an assistant, collected for the Honorable Walter Rothschild.

These three collections each furnished the occasion of a valuable treatise on Hawaiian birds, and the volumes issued by Palmer and Rothschild were beautifully illustrated. These, however, because of their cost, were accessible only to the few, and after devoting much time for several years to collecting and studying Hawaiian birds, especially those of the large Island of Hawaii, I wrote the little octavo volume of 146 pages entitled "Birds of the Hawaiian Islands", which was published by G. Thrum of Honolulu in 1902. By this means I hoped to leave some tangible evidence of my stay in the Islands, and, much more important, to place within reach of all a dependable account of the island birds. Subsequently my collection of Hawaiian birds was acquired by the Bishop Museum, which seemed to me its natural abiding place.

The indigenous birds of the Hawaiian Islands are unique in many particulars, both of structure and habits. They shun the neighborhood of settlements, and live in the deep forests far from man and his works, and thus one might spend a lifetime in the islands near the coast and never see a Hawaiian bird. The forest proper on the largest island of the group is, indeed, a uniform distance of about three miles from the ocean, this broad strip having been cleared of its original growth for agricultural purposes, particularly the cultivation of sugar cane. The forest undergrowth is dense, the trees tall and covered with epiphytic vines and shrubs, so that collecting under these circumstances is exceedingly difficult.

Nor is progress in these forests without real danger. Aside from the risk of losing one's way in this sea of vegetation, there are innumerable "blow holes" in the lava, many of which are so masked with ferns and grass that it requires the greatest care and watchfulness to avoid them, while to fall into one would be almost sure death. Under such conditions a good retriever is worth his weight in gold to the collector, and many a rare bird my own setter, Pilikia, saved for me and science.

BIRD PROTECTION IN HAWAII

When I first reached the islands there were practically no laws affording any real measure of protection to Hawaiian birds. Subsequently I drew up a law which was introduced into the Legislature in the form of a bill but failed of passage. Later, however, the same law with modifications was enacted, and

at present the island birds enjoy adequate protection so far as the law can afford it. They appear to stand in greater need of protection than the birds of mainland countries, possibly because, owing to their sedentary habits and the lack of competition during their many centuries of occupancy, they have become unable to cope with changed conditions, as the partial clearing of their native forests and the introduction of foreign species such as the mynah and others. Be the cause what it may, not a few of the island birds have become extinct within the memory of man, and others appear to be on their rapid way to the same sad fate. As bearing upon this point I may quote from a letter of January 1, 1919, from Brother Matthias, referring more particularly to my old collecting grounds in the districts of Hilo and Puna, Hawaii. In these, where, during the decade from 1894 to 1904, I found certain species numerous, he states that of late years the island birds have greatly diminished in numbers for no very obvious reasons, and he expresses the opinion that "Hawaiian birds are doomed and fifty years hence most species will be extinct."

HAWAIIAN LAND SHELLS

During my prolonged stay in the Islands I became much interested in the curious and beautiful tree and land shells, chiefly of the genera *Achatinella* and *Amastra*, which are famous among conchologists the world over. These genera are represented by upwards of 200 so-called species or varieties, the exact number varying widely according to the individual opinions of the different authorities. They were first brought to the attention of the outer world by Captain Dixon, who, on the occasion of his visit in 1786 found the natives wearing shell leis or necklaces, and who carried some of them back to England. The *Achatinellas* live chiefly among the leaves of trees, and the gathering of these gems of the shell world is to the island boy what egg collecting is to the boy of other regions.

Immense numbers of them have been gathered and have found their way into the hands of scientists all over the world, and much has been published on them and in many languages. The wide differences in form and color they display, the tendency of the several forms to coalesce, and the facts of their local distribution all unite to make their study intensely interesting and highly important from the evolutionary standpoint. I made an excellent start towards a collection of these beautiful objects (a lifetime might easily be devoted to the subject) with the view ultimately of publishing on them, a plan which so far has not materialized, with the exception of a short paper contributed to the *Journal of Malacology* (xi, 1904, pp. 56-64), entitled "On certain deposits of semi-fossil shells in Hamakua District, Hawaii, with descriptions of four new species."

RETURN TO THE MAINLAND

In the spring of 1904, finding myself once more in good working condition, I returned to California, where I spent several months. Later I visited Massachusetts, and early in 1905 I found myself once more in Washington and eager for work.

ENTER THE BIOLOGICAL SURVEY

After passing a civil service examination, I was appointed Administrative Assistant in the Biological Survey June 1, 1905, becoming its Assistant Chief in December of the same year, thus again taking up biological work which I had abandoned in favor of Anthropology so many years before. My pleasure at

being connected with the Survey was greatly enhanced owing to the fact that most of my associates were old and tried friends, to work with whom was like the renewing of old ties.

From this time on my duties lay chiefly in the administrative field, and included many subjects of interest and importance. From the first moment of my connection with the Survey I was impressed by the need of pushing all projects having a distinct economic bearing, as the boll weevil investigations, the food of birds in its relation to agriculture, the economic relations of our mammals, especially certain of the rodents, the protection of the waterfowl and of insectivorous birds and of large game; and it was to the development of these subjects that I gave most time and thought.

STUDY OF DIATOMS

I had always been interested in the microscope, although I had never done any serious work in the microscopic field, and had, indeed, never owned an instrument other than a pocket lens till in Hawaii when I equipped myself with a really good modern instrument. This I used chiefly in the study of shells, the teeth of mollusks furnishing characters of considerable value in their classification.

When I returned to Washington I found much interest and pleasure during evenings in studying pond life. This is a little world by itself, of inexhaustible interest and beauty, and as completely unknown to the uninitiated person as though he were on another planet. In the course of my investigations in fields microscopic, I made the acquaintance of diatoms, which may be briefly described as microscopic plants, chiefly built of silica, of almost infinite variety of form, and ornamented with bead and scroll work so as to be of surpassing beauty. Diatoms inhabit the waters of the earth, salt and fresh, in inconceivable multitudes, and form the food of many fishes as well as that of numerous small creatures which in their turn are devoured by fish. Hence, small as they are, they are of great economic importance.

Desirous of knowing more about diatoms than appeared in the literature accessible to me, I applied to Dr. Albert Mann, whose life-long studies in this field have made him passed master of the subject. When he showed me some slides of mounted diatoms I politely but firmly declined to believe that they had been mounted by human hands but must, I asserted, have grown in place. A demonstration of his method of mounting these minute creations, many of them less than a thousandth of an inch long, immediately followed and inspired me with such enthusiasm that I did not rest till I, too, was able to make diatom slides, which even the master was constrained to pronounce good. For several years I devoted, and still devote, much spare time searching for and permanently embalming in balsam these "gems of the plant world", until my collection of slides reaches into the thousands, many of the species being rare and others new to science.

During the summer of 1918, in company with Dr. Mann, I spent several weeks at Wood's Hole, Massachusetts, as the guest of the Bureau of Fisheries investigating the diatom life of that interesting region with special reference to the economic value of this water grass, as diatoms may be appropriately called, as food for fish and for such small organisms as constitute fish food.

This work, or rather play, has naturally led to an intimate acquaintance and firm friendship with Dr. Mann, and this I regard as by far the most valu-

able asset resulting from my incursion into the before unknown field of microscopy. I may add in connection with the use of the microscope that it is greatly to be regretted that the class of amateur microscopists of fifty years and more ago has become almost, or quite, extinct. The use of the microscope is no longer a fad of the many but the serious business of the few, and, while the discoveries with the instrument have been of surpassing value to mankind, I cannot but think that even as a plaything the microscope has many valuable lessons to teach and a world of beauty and interest to reveal to the inquiring tyro.

POPULAR TREATISES ON BIRDS

Soon after joining the Survey I dreamed of the possibility of a series of illustrated department bulletins on our common birds, which could be distributed freely over the country as a sort of textbook to foster and stimulate an interest in bird life. The cost of such books of course was the chief obstacle to the project, but in 1912 I was fortunate enough to interest in it the then Secretary, James Wilson, whose enthusiastic support enabled me a few days before his retirement, in March, 1913, to place in his hands the first copy received of Farmer's Bulletin 513, "Fifty Common Birds of Farm and Orchard". I was doubly fortunate in interesting in my scheme Louis Fuertes whose beautiful colored illustrations were chiefly responsible for the enthusiastic welcome the booklet received. This, perhaps, was the most popular bulletin ever issued by the Department, and the first and only edition, of 200,000, was soon exhausted, without beginning to supply the demand.

The little booklet having attracted the attention of Mr. Gilbert Grosvenor, Editor of the National Geographic Magazine, and, being impressed with its educational value to the public, he sought and obtained permission of the Department to republish it in the magazine, under the title of "Birds of Town and Country". As the state of the department funds was adjudged not to warrant further publications of the same character, Mr. Grosvenor undertook to publish the series I had contemplated, and happily was able to secure the cooperation of Mr. Fuertes. The result was the publication of two other bird papers, "Our American Game Birds", August, 1915; and "Friends of Our Forests", April, 1917. While the series by no means includes all our American birds, a considerable percentage of them is represented, and these the common species most likely to come to the notice of the bird lover and to excite his interest. My dream was thus made a reality by Mr. Grosvenor who deserves the thanks of all bird lovers for these popular bird treatises.

As nearly 12 years of my life (1905-1916) were spent in the service of the Survey, a few words as to its chief work may form a fitting close to these pages.

The investigations of the habits of the English Sparrow, which marked the inception of the Survey, naturally soon expanded into a general study of the food of our birds through an examination of their stomach contents, which time has shown to be the only reliable method. Thanks to the work of the division of Economic ornithology we now know with certainty the nature of the food of several hundred of our native birds, which thus can be accurately classified for legislative purposes, as beneficial, destructive, or both. In this work the United States has won an enviable position, since no other country has ever attempted such studies on anything like the same scale.

One of the most important functions of the Survey is the care and maintenance of the islands and tracts of land set apart as bird reservations, which now number no fewer than seventy, widely distributed through the country. Of this number all but three were designated as refuges during my term of service with the Survey, and it is a pleasure to be able to record the fact that of the whole number all but eight were proclaimed by Theodore Roosevelt during his terms of office as President. May we not consider these bird refuges set apart by his act as a most fitting memorial of one who was ever a most enthusiastic student of all wild life and a special lover of birds?

The number of places where birds may resort and lead their lives in peace has been still further augmented through the generosity of private individuals and societies, who have set apart more important tracts as sanctuaries. From the first, special efforts have been made by the Survey to cooperate with such enterprises, and to stimulate in every way possible a knowledge of, and an interest in, our bird life. This is a work in which there is room for all.

The mammal reservations in charge of the Survey, five in number, have also been very successful, and, come what may, are likely to insure the perpetuation of our biggest game animal, the bison, of our unique antelope, and of the elk and the several species of our native deer.

An important part of the work of the Biological Survey, that of destroying noxious rodents, has been very successful, and recently has assumed large proportions. This includes a war of extermination not only against several species of noxious rodents, including some that are plague carriers, but also against wolves and coyotes, which in recent years have proved enormously destructive to live stock. Because of the success achieved the number of states and stock associations that have entered into close cooperation with the Survey and that have contributed funds to directly assist in the work has recently largely increased. This part of the functions of the Survey is destined to assume still greater importance in the future.

The so-called Lacey Act, which enabled the Government through the Survey to aid the several States in the suppression of violators of the state game laws, was a long step towards the protection of American game birds. Still more important was the Migratory Bird Treaty Act, concluded August 16, 1916, which placed all our migratory birds under governmental supervision. But more important still was the treaty between Great Britain and the United States, concluded June 6, 1918, whereby the United States and Canada bind themselves to protect all migratory birds which pass from one country to the other, thus placing under the direct supervision of either country a great majority of the game and insectivorous birds of America. This is the first treaty of the kind ever entered into on this continent and it is hoped that the example thus furnished will be followed in time by every civilized country in the world.

The study of the several phenomena of migration, including the time of year, causes and methods of migration, and of the routes of travel pursued by the several species, has been an important object of the Survey for years and is still being carried on, notwithstanding the death of the lamented Prof. Cooke, whose earnestness of purpose, zeal, and grasp of the subject entitle his name to first place on the roll of the students of migration in this country.

Looking back on its 33 years of active work the Biological Survey may

point with pardonable pride to the organization of some important lines of research, to the consummation of some important projects, and to much good work in several lines of biologic research. Assured of its past, it may look forward with confidence to larger service and to a still greater measure of usefulness in the future.

In 1910, through the establishment of the Harriman fund, Dr. Merriam was enabled to relinquish all governmental work and to devote his undivided attention to scientific investigations of his own choosing, thus attaining a goal which many scientific men look forward to but rarely realize. In the Biological Survey, which he founded, and the affairs of which he so long and ably conducted, he has left a fitting monument. After his resignation I was appointed Chief of the Survey, June 1, 1910, which position I retained till December 1, 1916, when I resigned because of failing health, my successor being Mr. E. W. Nelson.

Washington, D. C., February 4, 1919.

THE EXISTENCE OF SEA BIRDS A RELATIVELY SAFE ONE

By JOSEPH GRINNELL

(Contribution from the Museum of Vertebrate Zoology of the University of California)

THE frequent reports of numbers of sea birds found along ocean beaches following storms are usually so worded as to lead the reader to infer that the life of oceanic birds is a markedly hazardous one. That quite the opposite is the case, under conditions undisturbed by the human factor, in comparison with most land birds is shown by a consideration of the breeding rates of the various species in question.

In no sea bird that frequents the North Pacific Ocean, insofar as I am aware, is more than one brood reared each year. Furthermore, with the majority of pelagic species, but one egg is hatched each year. Among these slow breeders are all of the albatrosses, all the petrels, the shearwaters, the fulmars, the auklets, the murres, most of the murrelets, and the puffins. With the Pigeon Guillemot and the kittiwakes, two eggs is the rule; while with most gulls, which, significantly, are much more littoral, three is the average number.

It is an accepted biological principle, I believe, that the rate of reproduction in any animal is somewhat in excess of sufficiency to meet the maximum probabilities of casualty in that species. Population may be supposed on an average to remain constant from year to year, even though we may observe fluctuations above or below the mean. Thus, in the case of the Fork-tailed Petrel, in which species but one egg is laid each year, the population of the species is raised not more than 50 per cent at the end of the breeding season—each two birds becomes three. But, by the beginning of the following nesting season, the population is (because of the average maintained norm) back to what it was a year previously. In other words, starting with 20 birds in April, there will be 30 (or less) by July; but by the April following, 10 of